is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical or greater, or has seeping water.)

Type B soils are cohesive soils with an unconfined compressive strength greater than 0.5 tons per square foot (48 kPa) but less than 1.5 (144 kPa). Examples of Type B soils are angular gravel; silt; silt loam; previously disturbed soils unless otherwise classified as Type C; soils that meet the unconfined compressive strength or cementation requirements of Type A soils but are fissured or subject to vibration; dry unstable rock; and layered systems sloping into the trench at a slope less than four horizontal to one vertical (only if the material would be classified as a Type B soil).

Type C soils are cohesive soils with an unconfined compressive strength of 0.5 tons per square foot (48 kPa) or less. Type C soils include granular soils such as gravel, sand and loamy sand, submerged soil, soil from which water is freely seeping, and submerged rock that is not stable. Also included in this classification is material in a sloped, layered system where the layers dip into the excavation or have a slope of four horizontal to one vertical or greater.

Layered geological strata. Where soils are configured in layers, i.e., where a layered geologic structure exists, the soil must be classified on the basis of the soil classification of the weakest soil layer. Each layer may be classified individually if a more stable layer lies below a less stable layer, i.e., where a Type C soil rests on top of stable rock.

The standard also contains other important criteria that must be examined to classify soils properly.

Important: (1) The laboratory testing process and compressive strength calculations must be conducted under the direction of a registered professional engineer. The OSHA standard requires that the excavation protection system be designed by a registered professional engineer when the depth of the excavation exceeds 20 feet or where unusual site conditions exist. (2) The manual field testing alternative permitted under the standard does not require the approval of a registered professional engineer under certain specific conditions. However, at least one visual test and one manual test are required to classify soil according to the OSHA method. The specific manual and visual field tests are listed and described in the standard.

Test Equipment and Methods for Evaluating Soil Type

Many kinds of equipment and methods are used to determine the type of soil prevailing in an area, as described below.

Pocket Penetrometer. Penetrometers are direct-reading, spring-operated instruments used to determine the unconfined compressive strength of saturated cohesive soils. Once pushed into the soil, an indicator sleeve displays the reading. The instrument is calibrated in either tons per square foot or kilograms per square centimeter. However, penetrometers have error rates in the range of ±20–40 percent.

1. Shearvane (Torvane). To determine the unconfined compressive strength of the soil with a shearvane, the blades of the vane are pressed into a level section of undisturbed soil, and the torsional knob is slowly turned until soil failure occurs. The direct instrument reading must be multiplied by 2 to provide results in tons per square foot or kilograms per square centimeter.
2. Thumb Penetration Test. The thumb penetration procedure involves an attempt to press the thumb firmly into the soil in question. If the thumb makes an indentation in the soil only with great difficulty, the soil is probably Type A. If the thumb penetrates no further than the length of the thumb nail, it is probably Type B soil, and if the thumb penetrates the full length of the thumb, it is Type C soil. The thumb test is subjective and is therefore the least accurate of the three methods.
3. Dry Strength Test. Dry soil that crumbles freely or with moderate pressure into individual grains is granular. Dry soil that falls into clumps that subsequently break into smaller clumps (and the smaller clumps can be broken only with difficulty) is probably clay in combination with gravel, sand or silt. If the soil breaks into clumps that do not break into smaller clumps (and the soil can be broken only with difficulty), the soil is considered unfissured unless there is visual indication of fissuring.

Plasticity or Wet Thread Test. This test is conducted by molding a moist sample of the soil into a ball and attempting to roll it into a thin thread approximately ⅛ inch (3 millimeters) in diameter (thick) by 2 inches (50 millimeters) in length. The soil sample is held by one end. If the sample does not break or tear, the soil is considered cohesive.

Visual Test. A visual test is a qualitative evaluation of conditions around the site. In a visual test, the entire excavation site is observed, including the soil adjacent to the site and the soil being excavated. If the soil remains in clumps, it is